

Remarks

This Reply responds to the Office Action mailed December 7, 2005. Applicants respectfully request reconsideration of the present application in view of the following remarks.

Claims 1 and 2 are pending in the application.

Summary of the Office Action

In the Office Action, claim 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,759,263 to Ying ("Ying") in view of U.S. Patent No. 6,452,764 to Abraham et al. ("Abraham") in further view of Wolf, *Silicon Processing for the VLSI Era*, Vol. 4, Lattice Press (2002) ("Wolf IV") and in further view of Wolf, *Silicon Processing for the VLSI Era*, Vol. 1, Lattice Press (2002) ("Wolf I"), and claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ying in view of Abraham, further in view of Wolf I, Wolf IV and U.S. Patent no. 6,083,794 to Hook *et al.* These rejections are respectfully traversed for the following reasons.

Response to Claim Rejections under 35 USC § 103

The rejection of claim 1 is respectfully traversed on two grounds. First, the combination of four references asserted in the Office Action constitutes impermissible hindsight as there is insufficient motivation to combine the references in the manner necessary to disclose the recited invention without the benefit of the teachings of the present application. Second, even if the four references are combined, the combination does not disclose all of the elements in the order recited in claim 1.

The Office Action admits that Ying fails to disclose subjecting the exposed portion of the free magnetic layer to a halo ion implant process. In fact, Ying includes no suggestion that any form of ion implantation could be added to the disclose processes for forming a MTJ cell. The Office Action instead relies on Abraham to teach oxygen ion implantation, but points to no motivation to combine in either Ying or Abraham to insert this step into the process disclosed in Ying at the particular point of just prior to the oxidizing step (as opposed to at a different step in the process). Instead, the Office Action relies on a fifth reference, Streetman, *Solid State Electronic*

Devices, Prentice Hall (1990), p. 323, to equate the metal gate formed in Abraham to the hard mask in Ying as justifying that the ion implantation process of Abraham, which does not include a hard mask step, should be inserted after the hard mask step in Ying. The Office Action then relies on the third reference, Wolf IV, for teachings of high-angle ion implantation at a precise depth and lateral distance from the gate. The Office Action relies on the general motivation of one skilled in the art to “reduced undesirable effects ... by increasing the insulative characteristics on the sides of the tunneling region.” However, this general statement of motivation to make a device better is merely a statement of a problem, and not a “clear and particular” motivation to combine the references in the particular manner required to disclose the elements recited in claim 1. See *Teleflex, Inc. v. Ficosa North Am. Corp.*, 299 F.3d 1313, 1334 (Fed. Cir. 2002) (“The showing of a motivation to combine must be clear and particular, and it must be supported by actual evidence.”).

The Office Action then relies upon the fourth reference, Wolf I, for a teaching that ion implantation “can cause crystal defects or amorphous layers in crystalline targets and that the damage can be removed by thermal processing.” The Office Action concludes by stating that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to convert the state of the exposed portion into an amorphous state ... because Wolf I teaches that ion implantation results in the formation of an amorphous region.” However, there is no support for this conclusory statement. The fact that Wolf I teaches that ion implantation “can” cause “amorphous layers” is not a motivation to actually conduct ion implantation in order to convert the exposed portion into an amorphous state. Thus, this assertion in the Office Action essentially admits that there is no motivation in the four cited references to conduct the halo ion implantation “process to convert the state of the exposed portion into an amorphous state” as recited in claim 1.

In sum, the combination of four references (or five references counting Streetman) cited in the Office Action merely provides a disjoint list of elements recited in claim 1 and does not disclose or suggest sufficient motivation to combine the elements in the manner recited in claim to demonstrate that the invention was in the public’s possession as obvious before the filing date of the present application.

Accordingly, Applicants respectfully submit that the rejection of claim 1 is based on impermissible “hindsight” reconstruction, using Applicants’ own teaching as a blueprint to hunt through the prior art for the claimed elements and combine them as claimed. See *In re Zurko*, 111 F.3d 8876, 42 USPQ2d 1476 (Fed. Cir. 1997); *In re Gorman*, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). Such an approach is “an illogical and inappropriate process by which to determine patentability.” *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570, 38 USPQ2D 1551, 1554 (Fed. Cir. 1996). For these reasons, Applicants submit that the obviousness rejection of claim 1 is improper and respectfully request its withdrawal.

Turning to the second ground, even if there were a motivation to combine the references asserted in the Office Action, the combination would not actually disclose all of the elements in claim 1 in the order of processing steps recited. Specifically, the combination does not disclose the steps of “subjecting the exposed portion of the free magnetic layer to a halo ion implant process to convert the state of the exposed portion into an amorphous state;” and then “oxidizing the exposed portion of the free magnetic layer in the amorphous state.” The references do not disclose or suggest that a halo ion implant process should proceed an oxidizing process. Accordingly, Applicants respectfully submit that claim 1 is allowable over the four cited references, and request withdrawal of the rejection under 35 U.S.C. § 103(a) of the claim.

Claim 2 depends from independent claim 1 and, as such, incorporates all the limitations of claim 1. Applicants respectfully submit that Hook fails to cure the deficiencies of Ying, Abraham, Wolf IV and Wolf I stated above. Consequently, claim 2, by virtue of its dependence on claim 1, is believed to be allowable for at least the aforementioned reasons, and withdrawal of the rejection of claim 2 under 35 U.S.C. § 103(a) is respectfully requested.

CONCLUSION

In view of the foregoing remarks, Applicants respectfully request that all objections and rejections be withdrawn and that a notice of allowance be forthcoming. The Examiner is invited to contact the undersigned attorney for applicants at 202-912-2155 for any reason related to the advancement of this case.

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Respectfully submitted,

A handwritten signature in black ink, appearing to read "Robert M. Hansen", written over a horizontal line.

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